UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/003,586	10/29/2001	Philip M. Hoffman	TN226	4732

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ART UNIT	PAPER NUMBER
2167	

DATE MAILED: 02/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>29 October 2001</u>.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-29</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>1-29</u> is/are rejected.

7) ☒ Claim(s) <u>1-10</u> is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☒ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Priority

1.   Applicant's claim for domestic priority under 35 U.S.C. 119(e) base on the

provisional application NO. 60/244,323 filed October 31, 2000 is acknowledged.

Claim Objections

2.   **Claims 1-10 are objected** to because of the following informalities: claim 1

recites the limitation "**the** first current node" in line 9. There is insufficient antecedent

basis for this limitation in the claim. Claims 2-10 are objected to by virtue of their

dependencies upon objected claim 1.

Specification

3.   The abstract of the disclosure is objected to because it contains the term

"**comprises**", which often used in patent claims, at lines 3 and 8. Correction is required.

See MPEP § 608.01(b).

4.   Applicant is reminded of the proper language and format for an abstract of the

disclosure.

The abstract should be in narrative form and generally limited to a single
paragraph on a separate sheet within the range of 50 to 150 words. It is important that
the abstract not exceed 150 words in length since the space provided for the abstract
on the computer tape used by the printer is limited. The form and legal phraseology
often used in patent claims, such as "means" and "said," should be avoided. The
abstract should describe the disclosure sufficiently to assist readers in deciding whether
there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information
given in the title. It should avoid using phrases which can be implied, such as, "The
disclosure concerns," "The disclosure defined by this invention," "The disclosure
describes," etc.

Claim Rejections - 35 USC § 101

5.   35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-29 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

As per claims 1-10 and 19-29, the languages of the claims raise the question as to whether the claim is directed merely to an abstract idea that is not tied to a technology art, environment or machine which would result in a practical application producing a concrete, useful, and tangible result to form the basis of statutory subject matter under 35 U.S.C. 101. For a claimed invention to be statutory, the claimed invention must be within the technological arts. Mere ideas in the abstract (i.e., abstract idea, law of nature, natural phenomena) that do not apply, involve, use, or advance the technological arts fail to promote the "progress of science and the useful arts" (i.e., the physical science as opposed to social sciences, for example) and therefore are found to be non-statutory subject matter. A process claim must somehow apply, involve, use, or advance the technological arts to be statutory subject matter.

In the present case of claims 1-10 and 19-29, the recited steps for continuing traversal of a tree do not apply, involve, use, or advance the technological arts since all of the recited steps can be performed in the mind of the user or by use of a pencil and paper.

Claims 11-18 are directed to "a computer-readable medium", which could be interpreted as product claims. However, the body of the claims are only directed to "the

data structure" and do not recite any functional element. Claims 11-18 are therefore

rejected under U.S.C 101 as being an abstract idea, directed solely to non-functional

descriptive material.

Claim Rejections - 35 USC § 102

6.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7.   **Claims 11-18 are rejected under 35 U.S.C. 102(e)** as being anticipated by

Berry et al. (US 6,728,955 B1), hereinafter "**Berry**".

As per claim 11, Berry teaches a computer-readable medium having stored

thereon a data structure for managing a plurality of elements related by hierarchy (See

Figs. 11A-B) the data structure representing one of the elements and comprising "a data

value field, a child pointer field, a sibling pointer field, and a unique counter field" at Col.

16 lines 25-40 and Col. 17 lines 15-30.

As per claim 12, Berry teaches the computer-readable medium of claim 11

wherein "the data structure further comprises a parent pointer field" at Col. 17 line 21.

As per claim 13, Berry teaches the computer-readable medium of claim 11 wherein "the elements comprise nodes in a tree" at Col. 17 lines 15-30 and Fig. 11A.

As per claim 14, Berry teaches the computer-readable medium of claim 11 wherein "the elements comprise nodes in a binary tree" at Fig. 11A.

As per claim 15, Berry teaches the computer-readable medium of claim 11 wherein "the unique counter field is populated with a non-decreasing counter value" at Col. 16 lines 25-40.

As per claim 16, Berry teaches the computer-readable medium of claim 11 wherein "the elements represent a process family structure" at Col. 14 lines 19-34.

As per claim 17, Berry teaches the computer-readable medium of claim 11 wherein "the elements represent a disk file directory structure" at Fig. 11A.

As per claim 18, Berry teaches the computer-readable medium of claim 11 wherein "the elements represent a computer program structure" at Col. 12 lines 47-60.

8.   **Claims 19-24 are rejected under 35 U.S.C. 102(b)** as being anticipated by Grand (US 4,823,310), hereinafter "**Grand**"

As per claim 19, Grand teaches a method for locating an updated continuation node in a dynamic binary tree formed by a family of nodes, each node in the family comprising a child pointer, a sibling pointer, and a unique counter value (See Figs. 1-3), the method comprising:

- (a) "receiving as input a continuation node and an abbreviated lineage for the continuation node" at Col. 4 lines 26-40;

- (b) "traversing the nodes in the tree along the abbreviated lineage until the counter value indicates that a first valid node beyond the continuation node has been reached" at Col. 4 lines 40-55.

As per claim 20, Grand teaches the method of claim 19 further comprising:

- (b)(1) "determining whether the continuation node still exists in the tree" at Col. 8 lines 5-20;

- (b)(2) "if the result of step (b)(1) is no, traversing the nodes in the tree along the abbreviated lineage until the counter value indicates that a first valid node beyond the continuation node has been reached" at Col. 8 lines 20-25.

As per claim 21, Grand teaches the method of claim 19 wherein step (b) comprises:

- (b)(1) "determining whether tile continuation node still exists in the tree" at Col. 8 lines 5-20;

- (b)(2) "if the result of step (b)(1) is no, determining whether the continuation node has a depth equal to or less than zero" at Col. 8 lines 5-20, and

- (b)(3) "if the result of step (b)(2) is no, traversing the nodes in the tree along the abbreviated lineage until the counter value indicates that a first valid node beyond the continuation node has been reached" at Col. 8 lines 20-25.

As per claim 22, Grand teaches the method of claim 19 wherein "steps (a) and (b) are performed in a first data environment and the input is received from a second process in a second non-native data environment" at Col. 4 lines 26-33.

As per claim 23, Grand teaches the method of claim 22 further comprising:

- (c) "passing as an output the updated continuation node to the second process"

  at Col. 4 lines 55-60.

  As per claim 24, Grand teaches the method of claim 19 wherein step (a)

comprises:

- (a)(1) "receiving as input a continuation node and a lineage for the continuation

  node" at Col. 4 lines 26-33; and

- (a)(2) "extracting an abbreviated lineage for the continuation node from the

  continuation node lineage" at Col. 4 lines 34-55.

Claim Rejections - 35 USC § 103

9.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10.   This application currently names joint inventors. In considering patentability of

the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g)

prior art under 35 U.S.C. 103(a).

11. **Claims 1-10 and 25-29 are rejected under 35 U.S.C. 103(a)** as being

unpatentable over **Grand** as apply to claims 19-24 above, and in view of Dale ("Abstract

Data Types: Specifications, Implementations, and Application"), hereinafter "**Dale**".

As per claim 1, Grand teaches a method for continuing a traversal of a tree

formed by a family of nodes, each node in the family comprising a child pointer, a sibling

pointer, and a unique counter value (See Figs. 1-2), the method comprising

- "receiving as input a continuation node and a lineage for the continuation node,

  the continuation node and lineage comprising an output of a first partial traversal

  of the tree" at Col. 4 lines 26-40;

(Grand uses the previously saved identification factors to

determined the starting node for a sequential read, wherein the

identification factors comprise "disk memory address of the node

of that last read record, the position of that last read record

within the node, and the key of the last record". The memory

address of the node, in conjunction with the tree structure,

will help decide the lineage for the node).

- "locating an updated continuation node in the binary tree by comparing the

  unique counter values of the family of nodes to a current node, the continuation

  node comprising the first current node" at Col. 4 lines 40-55; and

(Grand compare the timestamp of the node to locate a new node

(i.e., updated continuation node) to continue traversal of the

tree)

- "continuing the preorder traversal of the binary tree from the updated continuation node" at Col. 4 lines 40-55.

(Grand teaches "the first record in that new node is read")

The different between Grand and the invention of claim 1 is that Grand teaches the sequential traversal of a B-tree but does not explicitly teaches "preorder traversal of a binary tree" as claimed. However, "preorder traversal" and "binary tree" is well known in the art, as exemplary by Dale at pages 253, 255. Dale also teaches that "any general tree can be represented as a binary tree" at page 255. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to apply Grand's method not only to B-tree but also to "preorder traversal of a binary tree" as claimed. Using Grand's method with "preorder traversal of a binary tree" would result in an improvement in traversal of large binary tree and could be used with any application which represents data in preorder format sing binary tree.

As per claim 2, Grand and Dale teach the method of claim 1 as discussed above. Grand also teaches: "where the comparing step follows the lineage of the continuation node" at Col. 4 line 60 to Col. 5 line 2.

As per claim 3, Grand and Dale teach the method of claim 1 as discussed above. Grand also teaches: "wherein the b-tree comprises a dynamic b-tree" at Col. 4 lines 15-25.

As per claim 4, Grand and Dale teach the method of claim 1 as discussed above. Dale also teaches: "wherein the binary tree represents a general tree" at page 255.

As per claim 5, Grand and Dale teach the method of claim 1 as discussed

above. Dale also teaches: "wherein the binary tree represents a family of related

processes" at page 251.

As per claim 6, Grand and Dale teach the method of claim 1 as discussede

above. Grand also teaches: "wherein the binary tree represents a disk file directory

structure" at Col. 4 lines 9-25.

As per claim 7, Grand and Dale teach the method of claim 1 as discussed

above. Dale also teaches: "wherein the binary tree represents a computer program

structure" at page 276, Fig. 7.9.

As per claim 8, Grand and Dale teach the method of claim 1 as discussed

above. Dale also teaches: "wherein the nodes in the family further comprise a parent

pointer" at page 253, 3rd paragraph.

As per claim 9, Grand and Dale teach the method of claim 1 as discussed

above. Grand also teaches: "wherein an abbreviated continuation node lineage is

received as the input" at Col. 4 lines 25-55.

As per claim 10, Grand and Dale teach the method of claim 1 as discussed

above. Grand also teaches: "wherein the binary tree resides in a first environment and

the input is received from a second distinct environment" at Col. 4 lines 25-55.

As per claim 25, Grand teaches the method of claim 19 as discussed above.

Grand does not explicitly teach: "the binary tree represents a general tree". However,

Dale teaches that "any general tree can be represented as a binary tree" at page 255.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the

invention was made to combine Grand and Dale's teachings so that Grand's invention

could be used with any tree by first converting the tree to a binary tree, and therefore

simplify the tree traversal by applying standard binary tree algorithm traversal to any

tree.

As per claim 26, Grand and Dale teach the method of claim 19 as discussed

above. Dale also teaches: "wherein the binary tree represents a family of related

processes" at page 253, 2nd paragraph.

As per claim 27, Grand and Dale teach the method of claim 19 as discussed

above. Grand also teaches: "wherein the binary tree represents a disk file directory

structure" at Col. 4 lines 9-25.

As per claim 28, Grand and Dale teach the method of claim 19 as discussed

above. Dale also teaches: "wherein the binary tree represents a computer program

structure" at page 276, Fig. 7.9.

As per claim 29, Grand and Dale teach the method of claim 19 discussed

above. Dale also teaches: "wherein the nodes in the family further comprise a parent

pointer" at page 253, 3rd paragraph.

Conclusion

12.   The prior art made of record, listed on form PTO-892, and not relied upon, if any,

is considered pertinent to applicant's disclosure.

If a reference indicated as being mailed on PTO-FORM 892 has not been

enclosed in this action, please contact Lisa Craney whose telephone number is **(571)**

272-3574 for faster service.

Any inquiry concerning this communication or earlier communications from the
examiner should be directed to Khanh B. Pham whose telephone number is (571) 272-
4116. The examiner can normally be reached on Monday through Friday 7:30am to
4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's
supervisor, John E Breene can be reached on (571) 272-4107. The fax phone number
for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the
Patent Application Information Retrieval (PAIR) system. Status information for
published applications may be obtained from either Private PAIR or Public PAIR.
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you have questions on access to the Private PAIR system, contact the Electronic
Business Center (EBC) at 866-217-9197 (toll-free).

Khanh B. Pham
Examiner
Art Unit 2167

February 22, 2005